the user, the revised text is set forth as follows:

## § 53.20 General provisions.

\* \* \* \* \*

(b) For a candidate method having more than one selectable measurement range, one range must be that specified in table B–1 (standard range for $SO_2$), and a test analyzer representative of the method must pass the tests required by this subpart while operated in that range. The tests may be repeated for one or more broader ranges (*i.e.*, ones extending to higher concentrations) than the range specified in table B–1, provided that the range does not extend to concentrations more than four times the upper range limit specified in table B–1. For broader ranges, only the tests for range (calibration), noise at 80% of the upper range limit, and lag, rise and fall time are required to be repeated. The tests may be repeated for one or more narrower ranges (ones extending to lower concentrations) than that specified in table

B–1. For $SO_2$ methods, table B–1 specifies special performance requirements for narrower (lower) ranges. For methods other than $SO_2$, only the tests for range (calibration), noise at 0% of the measurement range, and lower detectable limit are required to be repeated. If the tests are conducted or passed only for the specified range (standard range for $SO_2$), any FRM or FEM method determination with respect to the method will be limited to that range. If the tests are passed for both the specified range and one or more broader ranges, any such determination will include the additional range(s) as well as the specified range, provided that the tests required by subpart C of this part (if applicable) are met for the broader range(s). If the tests are passed for both the specified range and one or more narrower ranges, any FRM or FEM method determination for the method will include the narrower range(s) as well as the specified range. Appropriate test data shall be submitted for each range sought to be included in a FRM or FEM method determination under this paragraph (b).

(c) \* \* \*

TABLE B–1—PERFORMANCE SPECIFICATIONS FOR AUTOMATED METHODS

| Performance parameter | Units [1] | SO$_2$ | | O$_3$ | CO | NO$_2$ | Definitions and test procedures |
|---|---|---|---|---|---|---|---|
| | | Std. range [3] | Lower range [2][3] | | | | |
| 1. Range | ppm | 0–0.5 | <0.5 | 0–0.5 | 0–50 | 0–0.5 | Sec. 53.23(a). |
| 2. Noise | ppm | 0.001 | 0.0005 | 0.005 | 0.5 | 0.005 | Sec. 53.23(b). |
| 3. Lower detectable limit | ppm | 0.002 | 0.001 | 0.010 | 1.0 | 0.010 | Sec. 53.23(c). |
| 4. Interference equivalent | | | | | | | |
| Each interferent | ppm | ±0.005 | [4]±0.005 | ±0.02 | ±1.0 | ±0.02 | Sec. 53.23(d). |
| Total, all interferents | ppm | — | — | 0.06 | 1.5 | 0.04 | Sec. 53.23(d). |
| 5. Zero drift, 12 and 24 hour | ppm | ±0.004 | ±0.002 | ±0.02 | ±1.0 | ±0.02 | Sec. 53.23(e). |
| 6. Span drift, 24 hour | | | | | | | |
| 20% of upper range limit | Percent | — | — | ±20.0 | ±10.0 | ±20.0 | Sec. 53.23(e). |
| 80% of upper range limit | Percent | ±3.0 | ±3.0 | ±5.0 | ±2.5 | ±5.0 | Sec. 53.23(e). |
| 7. Lag time | Minutes | 2 | 2 | 20 | 10 | 20 | Sec. 53.23(e). |
| 8. Rise time | Minutes | 2 | 2 | 15 | 5 | 15 | Sec. 53.23(e). |
| 9. Fall time | Minutes | 2 | 2 | 15 | 5 | 15 | Sec. 53.23(e). |
| 10. Precision | | | | | | | |
| 20% of upper range limit | ppm | — | — | 0.010 | 0.5 | 0.020 | Sec. 53.23(e). |
| | Percent | 2 | 2 | ............... | .......... | ............... | Sec. 53.23(e). |
| 80% of upper range limit | ppm | — | — | 0.010 | 0.5 | 0.030 | Sec. 53.23(e). |
| | Percent | 2 | 2 | — | — | — | Sec. 53.23(e). |

1. To convert from parts per million (ppm) to $\mu g/m^3$ at 25 °C and 760 mm Hg, multiply by M/0.02447, where M is the molecular weight of the gas. Percent means percent of the upper range limit.

2. Tests for interference equivalent and lag time do not need to be repeated for any lower $SO_2$ range provided the test for the standard range shows that the lower range specification is met for each of these test parameters.

3. For candidate analyzers having automatic or adaptive time constants or smoothing filters, describe their functional nature, and describe and conduct suitable tests to demonstrate their function aspects and verify that performances are within specifications under all applicable conditions. For candidate analyzers with operator-selectable time constants or smoothing filters, conduct calibration, noise, lag, rise, fall times, and precision tests at the highest and lowest settings that are to be included in the FRM or FEM designation.

4. For nitric oxide interference for the $SO_2$ UVF method, interference equivalent is ±0.003 ppm for the lower range.

\* \* \* \* \*

## § 53.21 Test conditions.

(a) *Set-up and start-up* of the test analyzer shall be in strict accordance with the operating instructions specified in

the manual referred to in § 53.4(b)(3). Allow adequate warm-up or stabilization time as indicated in the operating instructions before beginning the tests.

If the candidate method does not include an integral strip chart recorder, connect the output signal of the test analyzer to a suitable strip chart recorder of the servo, null-balance type. This recorder shall have a chart width of at least 25 centimeters, chart speeds up to 10 cm per hour, a response time of 1 second or less, a deadband of not more than 0.25 percent of full scale, and capability either of reading measurements at least 5 percent below zero or of offsetting the zero by at least 5 percent.

NOTE: Other data acquisition components may be used along with the chart recorder during conduct of these tests. Use of the chart recorder is intended only to facilitate evaluation of data submitted.

(b) *Calibration* of the test analyzer shall be as indicated in the manual referred to in § 53.4(b)(3) and as follows: If the chart recorder does not have below zero capability, adjust either the controls of the test analyzer or the chart recorder to obtain a +5% offset zero reading on the recorder chart to facilitate observing negative response or drift. If the candidate method is not capable of negative response, the test analyzer (not recorder) shall be operated with an offset zero. Construct and submit a calibration curve showing a plot of recorder scale readings (ordinate) against pollutant concentrations (abscissa). A plot of output units (volts, millivolts, milliamps, etc.) against pollutant concentrations shall also be shown for methods not including an integral chart recorder. All such plots shall consist of at least seven (7) approximately equally spaced, identifiable points, including 0 and 90±5 percent of full scale.

(c) Once the test analyzer has been set up and calibrated and the tests started, manual adjustment or normal periodic maintenance is permitted only every 3 days. Automatic adjustments which the test analyzer performs by itself are permitted at any time. The submitted records shall show clearly when any manual adjustment or periodic maintenance was made and describe the operations performed.

(d) If the test analyzer should malfunction during any of the performance tests, the tests for that parameter shall be repeated. A detailed explanation of the malfunction, remedial action taken, and whether recalibration was necessary (along with all pertinent records and charts) shall be submitted. If more than one malfunction occurs, all performance test procedures for all parameters shall be repeated.

(e) Tests for all performance parameters shall be completed on the same test analyzer, except that use of multiple test analyzers to accelerate testing will be permitted when alternate ranges of a multi-range candidate method are being tested.

EFFECTIVE DATE NOTE: At 75 FR 35599, June 22, 2010, § 53.21 was amended by revising paragraph (a), effective Aug. 23, 2010. For the convenience of the user, the revised text is set forth as follows:

### § 53.21  Test conditions.

(a) *Set-up and start-up* of the test analyzer shall be in strict accordance with the operating instructions specified in the manual referred to in § 53.4(b)(3). Allow adequate warm-up or stabilization time as indicated in the operating instructions before beginning the tests. The test procedures assume that the test analyzer has an analog measurement signal output that is connected to a suitable strip chart recorder of the servo, null-balance type. This recorder shall have a chart width of a least 25 centimeters, chart speeds up to 10 cm per hour, a response time of 1 second or less, a deadband of not more than 0.25 percent of full scale, and capability either of reading measurements at least 5 percent below zero or of offsetting the zero by at least 5 percent. If the test analyzer does not have an analog signal output, or if other types of measurement data output are used, an alternative measurement data recording device (or devices) may be used for the tests, provided it is reasonably suited to the nature and purposes of the tests and an analog representation of the analyzer measurements for each test can be plotted or otherwise generated that is reasonably similar to the analog measurement recordings that would be produced by a conventional chart recorder.

\*  \*  \*  \*  \*

### § 53.22  Generation of test atmospheres.

(a) Table B–2 specifies preferred methods for generating test atmospheres and suggested methods of verifying the concentrations. Only one means of establishing the concentration of a test atmosphere is normally required. If the method of generation